

WHAT IS CLAIMED IS:

1. An optical deflection device comprising:
  - an optical deflector including an optical deflection surface, whose attitude is controllable, to  
5 deflect a light beam;
  - a driver, which drives the optical deflector;
  - control means for generating a control signal to control the driver;
  - a light intensity detector, which outputs a light  
10 intensity signal corresponding to light intensity of the light beam deflected by the optical deflector;
  - light intensity monitoring means for monitoring a change with time of the light intensity signal output from the light intensity detector to output information  
15 on the change as a light intensity monitor signal; and
  - control signal monitoring means for monitoring a change with time of the control signal output from the control means to output information on the change as a control signal monitor signal,
  - 20 the control means generating the control signal to increase the output signal from the light intensity detector based on the light intensity monitor signal and control signal monitor signal.
2. The optical deflection device according to  
25 claim 1, wherein the control signal monitoring means comprises:
  - two control signal holding sections, which hold

the control signals at two different times; and

a control signal comparison section, which compares the two control signals held by the control signal holding section to output the information

5 concerning increases/decreases of the control signals as the control signal monitor signal, and

the light intensity monitoring means comprises:

two light intensity signal holding sections, which hold two light intensity signals at two different

10 times; and

a light intensity signal comparison section, which compares the two light intensity signals held by the light intensity signal holding section to output the information concerning increases/decreases of the light intensity signal as the light intensity monitor signal.

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3. The optical deflection device according to claim 2, wherein the control means comprises:

a judgment signal output section, which outputs information indicating whether to maintain or reverse the increase/decrease of the control signal as a judgment signal based on the control signal monitor signal and light intensity monitor signal; and

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a control signal update section, which generates the control signal based on the judgment signal.

25 4. The optical deflection device according to claim 3, wherein the control signal update section comprises:

a signal holding section, which holds a latest control signal;

an increase/decrease signal generation section, which generates an increase/decrease signal indicating  
5 an increase/decrease amount of the control signal; and

a calculation section, which adds or subtracts the latest control signal output from the signal holding section and the increase/decrease signal output from the increase/decrease signal generation section based  
10 on the judgment signal output from the judgment signal output section.

5. An optical switch comprising:

an input optical fiber;

output optical fibers;

15 an optical deflector including an optical deflection surface, whose attitude is controllable, to direct a light beam projected from the input optical fiber to one of the output optical fibers;

a driver, which drives the optical deflector;

20 control means for generating a control signal to control the driver;

light intensity detectors, which output light intensity signals corresponding to light intensities of the light beams coupled with the output optical fibers;

25 light intensity monitoring means for monitoring changes with time of the light intensity signals output from the light intensity detectors to output

information on the changes as a light intensity monitor signal; and

control signal monitoring means for monitoring a change with time of the control signal output from the control means to output information on the change  
5 as a control signal monitor signal,

the control means generating the control signal to increase output signals from the light intensity detectors based on the light intensity monitor signal and control signal monitor signal.  
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6. A control method of an optical deflection surface, comprising:

a setting step of setting an attitude of the optical deflection surface based on a control signal;

15 a holding step of holding the control signal and light intensity corresponding to the control signal; and

a generation step of generating a new control signal,

20 these steps being repeatedly executed, and

the generation step generating the control signal to bring the light intensity close to a maximum intensity based on a change of the control signal and a change of the light intensity synchronized with the change of the control signal, which are obtained by  
25 execution of a plurality of holding steps.

7. The control method according to claim 6,

wherein the generation step notes increases/decreases of the control signal and light intensity to generate the new control signal so that the increase/decrease of the control signal is maintained while the light intensity increasing, or the increase/decrease of the control signal is reversed while the light intensity decreasing .

8. A control method of an optical deflection surface, comprising:

generating a control signal to control the optical deflection surface to deflect a light beam in a target attitude; continuing to detect light intensity of the light beam deflected by the optical deflection surface; and continuing to change the control signal so as to increase the light intensity based on a change of the light intensity in response to the change of the control signal.

9. The control method according to claim 8, further comprising: increasing/decreasing the control signal; maintaining the increase/decrease of the control signal when the light intensity increases in response to the increase/decrease of the control signal; and reversing the increase/decrease of the control signal when the light intensity decreases in response to the increase/decrease of the control signal.

10. An optical deflection device comprising:

a movable mirror including a mirror portion, whose attitude is controllable, to deflect a light beam;

a driver, which drives the movable mirror;

5 a control circuit, which generates a control signal to control the driver;

a light intensity detector, which outputs a light intensity signal corresponding to light intensity of the light beam deflected by the movable mirror;

10 a light intensity monitor circuit, which monitors a change with time of the light intensity signal output from the light intensity detector to output information on the change as a light intensity monitor signal; and

15 a control signal monitor circuit, which monitors a change with time of the control signal output from the control circuit to output information on the change as a control signal monitor signal,

20 the control circuit generating the control signal to increase the output signal from the light intensity detector based on the light intensity monitor signal and control signal monitor signal.

11. The optical deflection device according to claim 10, wherein the control signal monitor circuit comprises:

25 two control-signal-storing memories, which hold the control signals at two different times; and

a subtraction circuit for the control signal, which compares two control signals held by the

control-signal-storing memories to output the information concerning increases/decreases of the control signals as the control signal monitor signal, and

5           the light intensity monitor circuit comprises:

          two light-intensity-signal-storing memories for the light intensity signals, which hold two light intensity signals at two different times; and

          a subtraction circuit for the light intensity  
10       signals, which compares the two light intensity signals held by the light-intensity-signal-storing memories to output the information concerning increases/decreases of the light intensity signal as the light intensity monitor signal.

15       12. The optical deflection device according to claim 11, wherein the control circuit comprises:

          a logic circuit, which outputs information indicating whether to maintain or reverse the increase/decrease of the control signal as a judgment  
20       signal based on the control signal monitor signal and light intensity monitor signal; and

          a control signal update section, which generates the control signal based on the judgment signal.

25       13. The optical deflection device according to claim 12, wherein the control signal update section comprises:

          a signal holding circuit, which holds a latest

control signal;

a signal generator, which generates an increase/decrease signal indicating an increase/decrease amount of the control signal; and

5 an addition/subtraction circuit, which adds or subtracts the latest control signal output from the signal holding circuit and the increase/decrease signal output from the signal generator based on the judgment signal output from the logic circuit.

10 14. An optical switch comprising:

an input optical fiber;

output optical fibers;

a movable mirror including a mirror portion,  
whose attitude is controllable, to direct a light beam  
15 projected from the input optical fiber to one of the output optical fibers;

a driver, which drives the movable mirror;

a control circuit, which generates a control  
signal to control the driver;

20 light intensity detectors, which output light intensity signals corresponding to light intensities of the light beams coupled with the output optical fibers;

a light intensity monitor circuit, which monitors  
changes with time of the light intensity signals  
25 output from the light intensity detectors to output information on the changes as a light intensity monitor signal; and

a control signal monitor circuit, which monitors a change with time of the control signal output from the control circuit to output information on the change as a control signal monitor signal,

- 5        the control circuit generating the control signal to increase output signals from the light intensity detectors based on the light intensity monitor signal and control signal monitor signal.